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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,844	07/25/2003	Jinhun Joung	2003P07969 US	2648

7590 02/27/2007

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EXAMINER	
MALEVIC, DJURA	
ART UNIT	**PAPER NUMBER**
2884	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/627,844	JOUNG ET AL.	
	Examiner	Art Unit	
	Djura Malevic	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 –28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hase et al. (US Patent 5,099,134) in view of Tang (US Patent 5,949,850) and Nishiki (US Patent 4,725,734).

With regards to claims 1 and 19, Hase discloses a collimator device and a method of forming a collimator device for nuclear imaging camera (Figure 6) (Background of the invention), comprising: a grid of collimation square holes formed by a plurality of sheets arranged in a grid pattern (Figure 6), each of said sheets having evenly spaced slots into which other sheets are inserted (Figures 1 and 2). Hase does not expressly disclose said sheets comprising an optically reflecting material coating at least a portion of the surfaces of said sheets and pixilated scintillators individually located in each of said collimation square holes.

Tang teaches pixilated scintillators individually located in each of said collimation square holes (Col. 11, Line 19) (Figures 13 and 14) (CLM 10). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Hase to include the pixilated scintillators such as that taught by Tang in order to construct an integrated grid/scintillator structure hence improving the overall imaging

quality. Note, it would also be obvious over applicant's own omission, given that applicant discloses prior art comprising a collimator with integrated crystals, wherein the integrated crystals addresses alignment problems [0012].

Nishiki teaches a collimator comprising plates wherein said plates are coated on both sides with a highly efficient reflector to reflect light beams generated from the scintillation element (Col. 3, Line 55-58). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Hase to include plates coated on both sides with a highly efficient reflector such as that taught by Nishiki in order to construct a collimated structure, which reflects light beams generated form the scintillation element, hence improving the overall imaging quality.

With regards to claims 2 and 20, Hase modified discloses a collimator comprising optically reflecting material (See rejection of claim 1), which obviously maximizes light intensity of pixilated scintillators events.

With regards to claims 3 and 21, Tang discloses said scintillators are scintillation crystals (Col. 11, Line 34). Note, applicant own omission also teaches scintillating crystals [0012].

With regards to claims 4 and 22, Hase discloses pixilated scintillators comprising square-shaped configuration (Figure 6).

With regards to claims 5 and 23, Hase discloses said plurality of sheets is formed of a material having a high density (Abstract).

With regards to claims 6 and 24, Hase discloses said high-density material is tungsten (Abstract).

With regards to claims 7 and 25, Hase discloses said high-density material is lead (Abstract).

With regards to claims 8, 9, 26 and 27, Hase modified discloses the use of an optical reflecting material [0039], however Hase modified does not disclose using exclusively TiO_2 or MgO as the reflecting material. It would have been obvious to include TiO_2 and MgO as the reflecting material, since it is conventionally used in that environment and would make the reflectance more efficient in view of what is old and well known in the art (See *conclusion* for cited prior art).

With regards to claim 10, Hase discloses a scintigraphic device (Background of the invention), comprising: a collimator (Figure 6) device including a grid of collimation square holes formed by a plurality of sheets arranged in a grid pattern (Figure 6), each of said sheets having evenly spaced slots into which other sheets are inserted (Figure 1 and 2). Hase does not expressly disclose said sheets comprising an optically reflecting material coating at least a portion of the surfaces of said sheets and pixilated scintillators individually located in each of said collimation square holes and a detector coupled to said pixilated scintillators and operable to detect radiation emanating from an object and interacting with said scintillators after passing through said collimator device.

Tang teaches pixilated scintillators individually located in each of said collimation square holes (Col. 11, Line 19) (Figures 13 and 14) (CLM 10). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Hase to include the pixilated scintillators such as that taught by Tang in order to construct an integrated grid/scintillator structure hence improving the overall imaging

quality. Note, it would also be obvious over applicant's own omission, given that applicant discloses prior art comprising a collimator with integrated crystals, wherein the integrated crystals addresses alignment problems [0012].

Nishiki teaches a collimator comprising plates wherein said plates are coated on both sides with a highly efficient reflector to reflect light beams generated from the scintillation element (Col. 3, Line 55-58). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Hase to include plates coated on both sides with a highly efficient reflector such as that taught by Nishiki in order to construct a collimated structure, which reflects light beams generated form the scintillation element, hence improving the overall imaging quality. Additionally, Nisshiki teaches a detector coupled to said pixilated scintillators and operable to detect radiation emanating from an object and interacting with said scintillators after passing through said collimator device (Col. 4, Line 32++). Thus, it would have been also obvious to one of ordinary skill in the art at the time the invention was made to modify Hase to include a detector coupled to said scintillators such as that taught by Nishiki in order to detect the emission of said scintillators.

With regards to claim 11, Hase modified discloses a collimator comprising optically reflecting material (See rejection of claim 10), which obviously maximizes light intensity of pixilated scintillator events.

With regards to claim 12, Tang discloses said scintillators are scintillation crystals (Col. 11, Line 34). Note, applicant own omission also teaches pixilated scintillating crystals [0012].

With regards to claim 13, Hase discloses pixilated scintillators comprising square-shaped configuration (Figure 6).

With regards to claim 14, Hase discloses said plurality of sheets is formed of a material having a high density (Abstract).

With regards to claim 15, Hase discloses said high-density material is tungsten (Abstract).

With regards to claim 16, Hase discloses said high-density material is lead (Abstract).

With regards to claims 17 and 18, Hase modified discloses the use of an optical reflecting material [0039], however Hase modified does not disclose using exclusively TiO_2 or MgO as the reflecting material. It would have been obvious to include TiO_2 and MgO as the reflecting material, since it is conventionally used in that environment and would make the reflectance more efficient in view of what is old and well known in the art (See *conclusion* for cited prior art).

With regards to claim 28, Hase discloses a building block for forming a collimator device of a nuclear medical imaging camera, comprising an elongated sheet of metallic material having a thickness suitable for functioning as septa of said collimation device, and having a plurality of evenly spaced slots into which other elongated sheets are inserted in order to form a grid pattern of collimation holes into which pixilated scintillators are placed. Hase does not expressly disclose the collimator coated with an optically reflective material. Nishiki teaches a collimator comprising plates wherein said plates are coated on both sides with a highly efficient reflector to reflect light beams

generated from the scintillation element (Col. 3, Line 55-58). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Hase to include plates coated on both sides with a highly efficient reflector such as that taught by Nishiki in order to construct a collimated structure, which reflects light beams generated form the scintillation element, hence improving the overall imaging quality (also, see rejection of claim 1, above).

Response to Amendment

The amendment filed 01/09/2007 was entered. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

Applicant's arguments, see REMARKS, filed 01/09/2007 with respect to the rejection(s) of claim(s) 1 - 28 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made (See rejections to claims 1 – 28 above).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bruening et al. (US Patent 5,013,921) teaches reflecting material between scintillators consisting at least one of TiO_2 or MgO.

Cusano et al. (US Patent 4,262,202) teaches that the interior walls of the collimator are coated with a reflective material to increase optical photon capture by the photoelectric devices.

Akai (US Patent 4,694,177) teaches that the interior walls of the collimator are coated with a reflective material.

Vafi et al. (US Pub. 2004/0238450 Al) teaches the use of an optical reflecting material, such as titanium dioxide, in order to increase light absorption by the scintillator.

Yoshida et al. (US Patent 5,276,328) teaches the use of titanium dioxide as a reflecting film.

Soluri et al. (US Pub. 2002/0175290 A1) teaches a scintigraphic device comprising a collimator, individually scintillation crystals and photomultipliers...etc.

Kurakake (US Patent 5,198,680) teaches a very similar collimator configuration as claimed (see figure 1c).

Tang et al. (US Patent 6,987,836 B2) teaches a similar collimator configuration as claimed (see figure 1).

Cusano (US Patent 4,187,427) and Cusano et al. (US Patent 4,415,808) both teach coating the walls of a collimator with magnesium oxide (MgO).

Sun (US Pub. 2004/0251420 A1) teaches the inner walls of an anti-scatter plate coated with high reflection material and signal crystals scintillators in a collimator.

Aykac et al. (US Pub. 2004/0232342 A1) teaches reflecting material between scintillators consisting at least one of TiO_2 or MgO.

Schmand et al. (US Pub. 2004/0232342 A1) teaches reflecting material between scintillators consisting at least one of TiO_2 or MgO.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Djura Malevic whose telephone number is 571.272.5975. The examiner can normally be reached on Monday - Friday between 8:30am and 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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ALBERT J. GAGLIARDI
PRIMARY EXAMINER